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Developing an Immediate Damage Assessment Procedure for the San Gabriel Fire Department

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Certification Statement

I hereby certify that this paper constitutes my own product, that where language of others is set forth, quotation marks so indicate, and that the appropriate credit is given where I have used the language, ideas, expressions, or writings of others.

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Abstract

The San Gabriel Fire Department had no current procedure for completing an immediate damage assessment procedure in place, significantly reducing the efficiency and effectiveness of their response to a disaster in the City of San Gabriel. Without such a procedure, field units were left to their own discretion to determine the course of action, slowing response, relief and recovery efforts.

Using action research methodology, this paper identified the key components of an immediate damage assessment procedure, and proposed a draft standard operating procedure. Four research questions examined the concept of immediate damage assessment and its important role in disaster mitigation, relief and recovery, the current procedures used by the SGFD to address damage assessment, the procedures in place in other fire agencies in the United States, and the critical components of a standard operating procedure on the subject.

The research included a review of literature related to the subject, an internal SGFD questionnaire, and an external questionnaire of Executive Fire Officer students and graduates across the United States. The results of the research were compared to the literature reviewed, and a series of recommendations were presented to promote the development of an updated and applicable immediate damage assessment procedure that will improve the efficiency and effectiveness of the actions taken by fire department field resources following a disaster.

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Introduction

The City of San Gabriel lies within the heart of Southern California's earthquake zone. While a widespread disaster has yet to hit the City, earthquakes within the last 20 years have caused significant damage to the City's infrastructure, and moderate damage to properties throughout the community. While earthquakes are the most prevalent natural disasters in the region, the City's close proximity to downtown Los Angeles, as well as numerous major transportation and utility lines that run through the jurisdiction increase the probability that a disaster resulting from man-made hazards or a terrorist event could severely impact the City.

As a full service municipal government, the City of San Gabriel is the provider of emergency and public services including fire and paramedics, law enforcement, street maintenance, and administrative services. Part of the commitment to the San Gabriel community is to respond to emergencies that occur within the City. The City's limited emergency resources make this challenging, and in a widespread disaster such as a large earthquake, an efficient and effective initial response by the San Gabriel service divisions, including the fire department, will set the framework for a successful mitigation and recovery operation.

The City of San Gabriel completed the revision of its Comprehensive Emergency Plan in July 2011. While the plan addresses the steps to be taken in the event of a major emergency and the subsequent activation of the Emergency Operations Center, the plan does not provide details of the individual steps to be taken to carry out the tasks involved in meeting the plan's overall objectives. One of the most critical points in any emergency are the initial steps taken in the

aftermath of a disaster, including the rapid, yet accurate assessment of damages, losses and injuries, as such information will serve as the basis for the effective planning and implementation of response, relief and recovery (Planitz, 1999). Planitz (1999) states that the “primary responsibility for disaster relief lies with the affected government” (p. 2).

In preparation for response to a disaster within the San Gabriel community, emergency responders from the San Gabriel Fire Department must be prepared to take an organized and coordinated approach to determining the scope of the damage, prioritizing the immediate needs, and requesting the necessary assistance and humanitarian aid as soon as possible. Accurate information must be collected by the field units, and systematically communicated to those in the EOC so that mitigation efforts can begin. Additionally, personnel in the field must maintain discipline when conducting the assessment so that it can be completed in a timely manner, and to ensure that the rapid damage assessment process gets completed without units becoming committed to individual issues that they encounter in the field.

At the onset of this research, the San Gabriel Fire Department has no current procedure for completing an immediate damage assessment, or “windshield survey.” By not having an updated procedure in place, field units are left to their own discretion to determine the course of action, reducing efficiency and effectiveness, as well as consistency in the information transmitted to the EOC. Delaying information collection has proven to significantly slow initial recovery efforts, increasing the potential for loss of life and secondary damage to property and the environment.

The purpose of this research is to develop a Standard Operating Procedure (SOP) that details how an immediate damage assessment or windshield survey will be conducted, consistent

with industry standards and other United States fire departments. Using action research methodologies, the SOP will be developed based upon research into the following four questions:

1. What is immediate damage assessment and why is it a critical step in disaster mitigation, relief and recovery?
2. How is immediate damage assessment addressed by the San Gabriel Fire Department in its current disaster plan and policies?
3. How do other fire departments address and/or conduct immediate damage assessment/windshield surveys?
4. What are the critical components of an SOP for conducting immediate damage assessments/windshield surveys?

"Effective mitigation of wide spread disaster is reliant on the ability to communicate damage assessments to the EOC, in order to effectively develop an efficient response to the disaster" (Morgan, 2008, p 10).

Background and Significance

Since FEMA (2011a) began recording the number of disaster declarations in 1953, the State of California has declared 78 disasters, second only to Texas with 85. In fact, of the 2,010 total declared disasters, California has more than double the average of 34. In the last 20 years, 31 major disasters have been declared in California, including 11 for storms and flooding, 7 for fires, and 6 for earthquakes. In 1992, 2 of 5 declarations that year alone were for earthquakes (FEMA, 2011b). These significant findings reflect the diverse challenges faced by most California cities due to the exposure to a greater frequency of disasters.

The City of San Gabriel's position in the center of Los Angeles County places it in the literal epicenter of a number of disaster risks, though none are as statistically significant as the risk of earthquakes. In 1987, the 5.9 magnitude Whittier Narrows Earthquake rocked San Gabriel. The epicenter of this earthquake was in Rosemead, within 5 miles of San Gabriel City Hall (Southern California Earthquake Data Center, n.d.). In total, the quake took eight lives and caused a total of $358 million in property damage. This quake, considered a strong quake by the US Geological Survey (2009), was a reminder to the citizens and employees of the City of San Gabriel of the forces beneath the surface that threaten our safety every day of every year.

The Southern California Earthquake Data Center (SCEDC) operates out of Caltech in Pasadena, California, and is the "primary archive of seismological data for Southern California" (n.d., p. "History of the Data Center"). SCEDC (n.d.) provides data regarding a number of seismic areas and known faults near the City of San Gabriel. Three significant faults are located within 20 miles of the City, including the Raymond fault, the Sierra Madre fault, and the Whittier fault. In 1988, the Raymond fault slipped, causing a 5.0 magnitude earthquake at 3:38 am. The Raymond fault has a probable magnitude of 6.0 to 7.0. The Sierra Madre fault caused a 5.8 magnitude quake in 1991 at 7:43 am. This quake caused $40 million in damage in San Gabriel Valley communities and killed two people. This fault could also produce a 6.0 to 7.0 magnitude quake. The Whittier fault, located east of San Gabriel, could produce a 6.0 to 7.2 magnitude quake, and slips 2.5 to 3.0 millimeters each year (SCEDC, n.d.).

The high likelihood of a disaster striking the City of San Gabriel leaves local officials obligated to prepare the community for response. Limited resources make this task extremely challenging, as a widespread disaster will drastically impact numerous jurisdictions in the Los Angeles County area, and each individual jurisdiction will fight for precious, limited resources

until help from the State of California arrives hours later. In preparation for resource requests, many jurisdictions have prepared by developing emergency plans. San Gabriel developed the first comprehensive plan in the mid-1990s, and the plan was re-written in 2010 and 2011. The newly adopted plan lays the foundation for emergency operations, and defines a multitude of roles and responsibilities, guides and forms, structure and management processes, and addresses specific problems caused by both natural and man-made forces. But in order for any plan to be useful, those carrying out such a plan must thoroughly understand how to perform the task related matters that the plan does not specifically address. This research seeks to provide the details of an immediate damage assessment procedure, giving first responders from the San Gabriel Fire Department the 'how-to' steps to efficiently and effectively carry out this critical first step of disaster response, relief and recovery.

The true risks presented in the previous paragraphs underscore the need for clear, concise procedures that are practical for use by company officers in the first minutes and hours after disaster strikes. In order to understand the urgency of the situation within the San Gabriel Fire Department, it is necessary to understand the basic history of the city and the organization. The City of San Gabriel is a densely populated, urban city located 10 miles east of downtown Los Angeles. Home of La Misión del Santo Príncipe El Arcángel, San Gabriel de Los Temblores, which was founded in 1771 by the Spaniards, San Gabriel is also known as "The Birthplace of Los Angeles." The City of San Gabriel was incorporated in 1913, is home to 39,718 people, and covers 4.2 square miles. There are 13,237 housing units (U.S. Census Bureau, 2010), making the community largely residential, with a mix of light industry and two major commercial corridors which largely serve the rapidly growing Asian American population.

The San Gabriel (CA) Fire Department, which serves this diverse community, employs 36 personnel, 35 of whom are sworn, uniformed firefighters, including four administrators. These personnel operate out of two fire stations, and provide a full range of emergency services including fire suppression and emergency mitigation, paramedic transport, and fire prevention/public education.

The San Gabriel Fire Department is a party to the State of California Master Mutual Aid Agreement. Resources from the SGFD are made available to other agencies in the state, and in return, resources from other agencies become available to San Gabriel. In this arrangement, the State of California is broken down by the State's emergency management agency, CalEMA, into seven regions: Region I, II North, II South, III, IV, V, and VI. San Gabriel is assigned to Region I, Area C, along with 10 other cities.

The Area C coordinator within Region I is Verdugo Fire Communications Center (VFCC), to which the SGFD contracts to provide dispatch and communication services. As the coordinator, VFCC is the resource ordering point for SGFD. VFCC, or Verdugo Dispatch, dispatches fire resources in 12 cities that protect their respective jurisdictions out of 43 fire stations. These 12 agencies serve a total population of nearly 900,000 and cover a total of 134.38 square miles (VFCC, 2010). Initially established in 1979 by Glendale Fire Department, the SGFD joined Verdugo Dispatch in April, 2000.

The City of San Gabriel Comprehensive Emergency Plan (San Gabriel City, 2011) addresses the City's planned response to extraordinary emergency situations that occur due to natural causes, technological incidents, or national security matters. It specifically states that the operational concepts of the plan are focused on large-scale disasters that create unusual

emergency responses. The plan is part of the California Standardized Emergency Management System (SEMS) and the National Incident Management System (NIMS). It further distinguishes that "each element of the emergency management organization is responsible for ensuring the preparation and maintenance of appropriate and current standard operating procedures (SOP's)…and checklists that detail how assigned responsibilities are performed to support SEMS/NIMS implementation" (San Gabriel, 2011, p. x). This research paper will attempt to develop the criteria for, and the draft version of, an immediate damage assessment standard operating procedure.

The current practice in the SGFD is to develop the plan for response to a major event in the city shortly after it occurs. This "plan on the fly" practice leaves most personnel scrambling to deal with the situation, and leads to an inefficient and ineffective response. Chandler (2008) shares the failures of Columbus (MS) Fire Rescue (CFR) in their response to a number of weather related disasters since 1998. Chandler states that the lack of a damage assessment process caused the following problems during these events:

- Duplication of efforts between agencies and within CFR personnel called in to assist.
- Delays in prioritizing needs related to lack of complete pre-planning processes.
- Critical infrastructure and high-risk occupancies that were never assessed.
- Poor communication of information from the field to the EOC, attributed to the lack of training, standardized forms, and biased information collection.

Chandler adds that many of these issues could have been resolved had a rapid damage assessment procedure been in place at the time of the incidents (2008). The lack of a procedure in San Gabriel would likely cause a similar set of problems in the event a disaster was to occur.

As this research is intended to discover, numerous authors describe the importance of conducting damage assessment. Larry Collins, a Los Angeles County Fire Department Battalion Chief, wrote an article eight years after the Northridge Earthquake. In it, Collins recommends that departments develop an earthquake plan that includes, among other things, a policy that makes the jurisdictional survey the most important action, aside from immediate life-saving or conflagration-preventing actions (2002). The Emergency Management Institute (EMI) adds that the failure to follow protocol for damage assessment caused delays in the arrival of FEMA personnel and resources on several incidents, emphasizing the critical nature of the immediate damage assessment as part of that process (n.d.). Immediate damage assessment has been shown to reduce the delay in response when it is performed in a coordinated, practiced manner.

The topic of immediate damage assessment was selected by the author not only because of its importance to the organization, but also because it is directly relevant to the National Fire Academy Executive Fire Officer Program desired course outcomes for the Executive Analysis of Fire Service Operations in Emergency Management (EAFSOEM). The desired outcomes include preparing senior officers to effectively manage the operational component of a fire department (FEMA, 2009), which is what this research is intended to do. Additionally this research will meet the EAFSOEM text Unit 6 objective by developing a process of acquiring and using damage assessment information (ibid, 2009). The research will also relate to and support the United States Fire Administration's strategic goals #1, reducing the risk at the local level through mitigation measures; #2, by improving local planning and preparedness; and #3, by improving the San Gabriel Fire Department's capability for response to and recovery from all hazards (USFA, 2011).

Literature Review

A review of literature related to the subject was initiated and involved a wide range of technical manuals, technical guides, fire department policies and procedures, applied research papers, periodicals, manuals, standards, books, the internet, and personal communications. The literature addresses each of the four research questions; however the author's search for literature addressed several of the questions in much more detail than others.

While conducting research into the topic of damage assessment, it quickly became evident that there are numerous terms used to describe post-disaster damage assessment. The scope of this paper is limited to the damage assessment that is conducted by the first responding emergency units, specifically those from the San Gabriel Fire Department. Many authors refer to this as "Rapid Damage Assessment," "Initial Damage Assessment," or a "Windshield Survey." For the purposes of this research, each of those terms will be used to refer to the same concept (except when stated) during the literature review. For consistency, this author will refer to the term *immediate damage assessment* throughout the remainder of the text beyond the literature review.

Damage assessment and why is it critical to response, mitigation and relief.

To determine the role that initial damage assessment plays in the incipient stages of disaster response and mitigation, it makes sense to identify just exactly what damage assessment is, and why it is critical to the response, mitigation and relief phases of a disaster. In the National Fire Academy's Executive Fire Officer Program text for the Executive Analysis for Fire Service Operations is Emergency Management (EAFSOEM) course, damage assessment is defined as, "…a gathering of information related to the impact of an event, or series of events, on life and

property within a defined area" (FEMA, 2009, p. 6-3). Further, the student manual clearly identifies two types of damage assessment: immediate and post-incident. While post-incident damage assessment is conducted following the active phase of the incident to analyze the total damage, this research focuses on immediate damage assessment. FEMA (2009) describes immediate damage assessment as information gathering that occurs upon the arrival of emergency workers at the site or area for the purpose of using such information in much the same way a size-up is used at a fire scene. From such information, incident commanders can begin to develop strategies and tactical objectives, resources can be requested and deployed effectively, and information can begin to be disseminated to other agencies. FEMA specifically claims that unreasonably long response times can occur if immediate damage assessment is ineffective or delayed (FEMA, 2009).

Planitz (1999) suggests that effective response to a disaster is incumbent upon "clear and concise assessment of damages, losses and injuries in the aftermath…" (p.2). Breaking damage assessment into two types, initial and detailed, Planitz explains that the initial assessment focuses on immediate response needs, and is conducted during the initial stages of the disaster. Damage assessment should be performed with the objectives of determining the nature and extent of the disaster, needs of the community affected, resources required and the need for additional assistance (Planitz, 1999).

There are three types of damage assessment identified by McEntire (2002): rapid or initial damage assessment, preliminary damage assessment, and technical damage assessment. Rapid damage assessment provides a snapshot of the involved area. It generally involves gathering information related to human casualties and damage to structures, and is most commonly performed in a vehicle (thus referred to as a windshield assessment). Since this type

of assessment is conducted on the ground, technical assessments of individual sites within the disaster zone are not undertaken. Like Planitz, McEntire states that damage assessment is the single most important function performed after disaster strikes, as it provides vital information that will be used to effectively provide aid to those injured, or otherwise affected by the event (2002).

FEMA (2009) identifies eight steps of the incident action plan cycle, the first of which is understanding the situation. Immediate damage assessment is a critical part of the development of incident objectives, strategies and tactical direction, and it also impacts resource assignments. All of these steps must occur before formal planning can begin. Damage assessment is required before a federal declaration can be made and recovery assistance becomes possible (EMI, n.d.).

Clearly there are a number of different names for early damage assessment but Auf der Heide (1989) emphasizes the difficulties that occur when the process is not memorialized in writing, accepted, reviewed and practiced prior to a disaster occurring. When the responsibility for damage assessment is not clearly delineated, information is often obtained that pertains more to the individual organization who obtains it, and a global perspective of the event is never realized. Also, disasters are often in a state of constant change, and adjusting to such changing needs requires ongoing assessment.

The State of California's Emergency Plan, developed by the California Emergency Management Agency (CalEMA) in 2009 sets the following goals, priorities during the response phase:

- Goals: Mitigate hazards, meet basic human needs, restore services and support economic recovery.

- Priorities: Life, health and safety, property and the environment.
- Strategies: Mitigate hazards, meet basic needs, including for those with disabilities and the elderly, restore utility services and support economic recovery.

Further, the plan states that all levels of emergency response agencies must ensure an effective flow of information by establishing solid systems and protocols. Finally, CalEMA outlines a process for resource management that emphasizes the requirement that all resource requests from the state include a clear description of the situation, the nature of the service that the resource will be expected to provide, the time frame needed and duration, and other logistical support needs (2009). All of this information must be obtained expediently, as large scale disasters in Southern California, such as major earthquakes, generally impact numerous jurisdictions simultaneously, creating a desperate scramble for scarce resources. The faster the requests are submitted, the more likely the chances are that they will be received, provided the request conditions are met as required.

How the San Gabriel Fire Department currently addresses damage assessment.

The San Gabriel Fire Department operates under several documents that outline policies and procedures. The Operations Manual is a document that the organization has struggled to keep consistent in format and content and, over the last few years, it has been the subject of discussion regarding the dire need to review and rewrite the contents several times over the last few years. Many policies and procedures commonly found in other department's policy and procedure manuals are not found in the San Gabriel version. Many more policies in the manual are outdated, including a number that no longer apply to the current fire department operation.

One policy that discusses post disaster protocol is titled “Disaster Operations: Post Disaster Activity” (Appendix A).

The SGFD Policy Manual (n.d.) policy on post disaster activity very briefly describes the actions to be taken by fire department units. It states that units will respond to incoming calls for aid following normal dispatch policies, and incident tracking will be accomplished by dispatch using a form provided (Appendix B). If there are no calls for aid, units are to inspect their district and document the findings on the “Major Incident Tracking” form (Appendix C), then relay information back to dispatch. In the event of widespread damage, units are to take no action until the city has been “surveyed.” There is no definition or description of how a survey is to be accomplished. Further, the dispatch referred to in the most current policy was the dispatch the fire department provided for its own resources from a desk in the fire station. This system was replaced by a modern, 14-city dispatch system when San Gabriel joined Verdugo Fire Communications Center (VFCC) in April of 2000. This policy is outdated, not followed, and not applicable.

In addition to the policy, an attachment exists (Appendix D) that outlines areas to be checked in each of the two engine company districts. It describes a drive route, but lists only a handful of locations that might be considered target hazards to be inspected. A map is also provided. When the SGFD began contracting with VFCC, a new set of policies and procedures were introduced in order to maintain order in the face of all incident types, large and small. As the Area C coordinator, it is critical that all agencies contracted with VFCC follow the procedures for post-disaster communications (VFCC, n.d.).

In Section 12, Emergency Procedures, VFCC (n.d.) states the following:

> In significant events, each city generally becomes their own operational area, operating on a particular assigned radio communications channel, controlling their own resources until such time control is released back for normal operations on a common communications channel with Verdugo Fire Communication (Section 12, p. 4).

The manual goes on to state that significant events include earthquakes, hurricanes, tornadoes, terrorism, civil unrest, major accidents, or any other event that impacts one jurisdiction or all jurisdictions. Under the plan, battalion chiefs in each agency will retain operational control of local resources as needed, and will serve as the point of contact with VFCC. The policy also describes specific radio procedures that will be used during the incident, a specific communications plan, and a system that lets the battalion chief designate the level of emergency operation that the agency will be operating under. Such system designates four levels, with the least severe being Level A, and the most severe Level D. In Level A, a significant event has occurred, but VFCC is operational and continues dispatching, with a low level of emergency calls from the public. Level B is similar, but with a higher call volume, and responses may be downgraded. In Level C, call volume has exceeded the capacity for verbal dispatches, and calls for aid are relayed to each agency battalion chief. In Level D, VFCC is non-operational, and units are dispatched via a joint effort through local law enforcement call centers. In Levels C and D, the battalion chief becomes the point of contact for SGFD units in the field (VFCC, n.d.).

The VFCC manual is in direct conflict with existing SGFD operations manual policy, as the VFCC communications and dispatch procedures currently in use cannot be utilized as the SGFD policy states. This research will address changes necessary to allow the SGFD policies and procedures to fall in line with VFCC policies that are already established and practiced. The

VFCC manual clearly indicates that post-earthquake, each fire station should follow normal operating procedures per each department, conduct a radio check, and then operate as indicated by department policy/procedure (n.d.).

The City of San Gabriel Comprehensive Emergency Plan (2011) identifies the organizational response levels and requirements for activation. In reference to the field level, the Standardized Emergency Management System (SEMS) regulations, which are required by California Government Code §8607 (a), mandate that the Incident Command System (ICS) be used. At the local government level, SEMS must be used when the emergency operations center (EOC) is activated, or a local emergency is proclaimed or declared in order to be eligible for state funding of response related personnel costs. The plan acknowledges that during a major area-wide disaster occurring in multiple operational areas, local government is responsible for assessment of its capabilities and reporting this information to the operational area. Further, the EOC must establish priorities, allocate resources in the field, and request assistance through the operational area (in San Gabriel, this is through Los Angeles County EOC) (San Gabriel, 2011).

As the San Gabriel Emergency Plan relates to damage assessment directly, it assigns the responsibility in the ICS to the Damage Assessment Unit Leader, under the Planning and Intelligence Section Chief (ibid, 2011). According to the plan, the damage assessment unit leader is responsible for collecting and documenting all structural damage and making safety determinations of specific structures, including placarding such structures as appropriate. In a personal communication with Battalion Chief Bryan Frieders, SGFD, (2011), Frieders stated that the damage assessment referred to throughout the plan is intended for a thorough assessment of individual property damage,

and not the windshield survey that will be performed by the crews in the field (B. Frieders, personal communication, August 1, 2011).

Appendix 3 of the San Gabriel Comprehensive Emergency Plan (2011) provides checklists for the following specific hazards: earthquake, hazardous materials incidents, floods and storms, fire, transportation incidents, civil unrest and disobedience and other critical incidents/tactical callouts. In the checklist for earthquake, the plan calls for field units to conduct a general area survey after completing a critical facilities check. No list of critical facilities is presented in the plan (San Gabriel, 2011).

How other fire departments conduct immediate damage assessment.

Literature related to specific department damage assessment procedures is limited, however Strickland (1998) describes the "windshield survey" concept used by Fairfax County Fire and Rescue Department (VA) that emulates the process used in California for earthquakes. Fairfax County uses the process for emergences ranging from hurricanes, flooding, and tornadoes to heavy snow conditions. Good damage information is essential for needs assessment and planning.

In the Fairfax County procedure, each fire company surveys its' first-in district by driving a pre-determined route. During the drive, occupancies with high life risks, fire potential, hazardous materials, infrastructure or transportation routes are assessed for damage. Findings of each company are reported to the battalion chief, who relays the information to the division level, and then a decision on resource commitment is made. Information continues up the chain of command to the overall Incident Commander, and the EOC (Strickland, 1998).

Strickland adds that a particularly difficult task is completing an area survey before committing resources to specific locations, as firefighters have difficulty passing citizens who need aid. In the opinion of Strickland, too many agencies have not spent enough time considering how damage assessment would be undertaken in their own jurisdictions (1996). Fire department officials are the most qualified to provide quick and accurate information on the extent and location of damaged structures, injured persons, and resources needed to mitigate the immediate threats to life, property, and the environment.

Los Angeles County Fire Department fire companies conduct a site survey of personnel, equipment and the facilities within 15 minutes of an event. The information related to this site survey is reported to the battalion commander, and any action at the site that is needed to secure it is taken. The units then conduct a jurisdictional survey that is also reported to the battalion chief. The survey focuses on high life hazard facilities, major transportation routes and other pre-identified locations. Resource needs are determined and any additional actions that follow depend on the magnitude of the event and regional needs. Priorities for field units always start with life safety (regardless of the resources available), and follow with property and the environment (PVAN, n.d.).

The City of Los Angeles (1998) bases the responsibility for damage assessment on the scope of the disaster. For small to moderate events, such as fire, flood or minor earthquake, fire department resources are considered the principal responders and will obtain “disaster intelligence information” (p. 8). In contrast to Los Angeles County Fire Department protocol, Los Angeles City fire resources are committed to life safety in a major disaster, while damage assessment is the responsibility of other City of Los

Angeles departments. The LAFD also makes their helicopter resources available for aerial reconnaissance missions (City of Los Angeles, 1998).

Critical components of an Immediate Damage Assessment procedure.

While conducting the literature review, the author discovered that many states have specified protocols and guidelines for jurisdictions to follow when conducting damage assessment. FEMA has established such guidelines, which will be discussed in this literature review. California's CalEMA, however, does not provide detailed processes for immediate damage assessment, though it requires damage estimates to support requests for disaster assistance (CalEMA, 2004). The large size of the state has forced CalEMA to subdivide fire resources into regions. Preliminary damage assessment findings are used at the local and regional level, thus eliminating the need for such detailed (resource specific) information at the state level. The State of California's Emergency Plan emphasizes the need for effective intelligence flow from the field level, to the local EOC, the Operational Area, the region and to the State Operations Center (CalEMA, 2009).

This author found a great deal of literature that identified the critical components of an effective immediate damage assessment procedure. Many of those components were consistent from author to author. The National Fire Academy (NFA) (2009) emphasizes the fact that developing a damage assessment procedure during the event will lead to problems, setting the grounds for ineffective response, and that the development should include a representative of all agencies that may take part in the process.

Several authors stated the importance of using damage assessment principles as a basis of any procedure development. McEntire (2002) suggests three major challenges to those conducting damage assessment: disaster area access, coordination of those conducting damage assessment, and reporting problems. In response to these challenges, McEntire offers four principles to improve damage assessment: preparedness activities, well coordinated actions between all individuals, functional organizations and teams, and accurate appraisals with accurately compiled reports submitted to state and federal authorities (2002). While this particular research focuses on the assessment itself, the importance of this initial assessment cannot be understated in terms of its role in a successful operational outcome.

Preparation before the disaster helps determine potential humanitarian needs, and determine possible relief measures. This also works to reduce vulnerability to future disasters (Planitz, 1999). A repeating theme amongst the authors reviewed is on preparation, planning and training. Responders interviewed after the Paso Robles (CA) earthquake stated that they felt that the planning, training and experience in damage assessment that they had prior to the event made it easier to perform in the stress of the disaster (McEntire and Cope, 2004). It is necessary to plan, train and exercise to effectively and efficiently conduct damage assessment, particularly during the chaotic initial stages of a disaster (McEntire, 2002).

During the EAFSOEM course, instructors distributed a document on rapid damage assessment that states that rapid damage assessment involves developing plans and procedures, and “testing, evaluating, and finalizing the plan” (NFA, 2008, p.1). The

development of a community profile is necessary as a basis for the procedures for a rapid (immediate) damage assessment. The community profile includes:

- Major geographic features
- Location of population concentrations
- Location of essential facilities; police and fire stations, medical facilities utilities and shelters
- Location of resources such as equipment caches, etc.
- Major transportation routes
- Hazard types; warning versus sudden impact
- Normal deployment standards for all local agencies/departments

Once a profile of the jurisdiction is complete, a risk assessment of each district can be completed. Police, firefighters and public works staff operate in each of these districts each day, and would be best suited to complete the rapid (immediate) damage assessment (NFA, 2008) and (Armstrong, 2009).

Those receiving the information in the management system must develop a user-friendly communication system, and a data collection/data organization process (NFA, 2008). The EOC will ultimately need to receive the information so that it can be processed into a plan. Each of these components will become part of a damage assessment procedure, and predetermining communications and data collection enhances the effectiveness of the plan. Data collection forms should be developed for predetermined hazards, or infrastructure and critical target hazards identified in the risk assessment process. Such pre-developed forms help to ensure that any responder to the

location gathers the same type of information and report it in the same way (NFA, 2008). It also provides a written record of the assessment that may be necessary at a later time.

The Emergency Management Institute (EMI), part of the National Emergency Training Center (NETC) developed a resource guide, the *Rapid Assessment Planning Workshop in Emergency Management (WEM),* which serves as a guide for the development of rapid assessment procedures. While the terms, once again, change from what other government agencies use, the process that EMI identifies mirrors that in the material by NFA that was previously presented. EMI (1995) lists the following major categories of information that must be gathered by field units during immediate damage assessment: Life safety (number in need of rescue, dead and injured, and in need of evacuation); status of lifelines (gas, electric, water and transportation routes); status of essential facilities (police, fire, shelters, hospitals, and communication system); status of imminent hazards; status of access routes; major problems by sector; status of resources including requests for assistance. Too much information, however, will increase the chances of problems in the data recording process (EMI, 1995).

The immediate assessment is intended to determine immediate response needs, and is a broad scope assessment of the magnitude of the disaster. It should also evaluate the community's capacity to cope and identify the most urgent relief needs and how these needs can be met with limited resources. In essence, it addresses what has happened and what needs to be done. A well developed procedure assesses the affected area for life safety issues (injuries, deaths, number affected and their condition), basic needs of the population (shelter, water and food, medical and health issues, transportation, communication), and hazardous conditions that can affect the first two (Planitz, 1995).

Auf der Heide (1989) adds, “when the situation analysis is complete, the results should identify those general problems that have to be tackled (incident objectives)” (p. 89). As a number of authors mention, any plan or procedure is only as good as the way it is exercised in training and during an actual event. Investing valuable time in planning, training and exercising damage assessment procedures increases effectiveness and efficiency (McEntire, 2002). McEntire also advises holding post mitigation meetings to evaluate the processes. EMI (1995) discusses evaluation of exercises and events, emphasizing the important role that this plays in improving the response of emergency services in the future.

Summary Statement

A great deal of research has been done into immediate damage assessment, yet interestingly many jurisdictions, including the San Gabriel Fire Department, have failed to implement a standard operating procedure defining the actions to be taken during a disaster. The scope of a disaster easily overwhelms the human ability to react naturally, and the need to plan, train and exercise cannot be overstated.

San Gabriel sits in an area extremely prone to earthquakes, and the jurisdiction has suffered several earthquakes in recent years that caused significant damage to surrounding areas. Fortunately, San Gabriel has escaped relatively unharmed, yet the risk remains, and it is simply a matter of time before luck runs out. A renewed interest in disaster management and the revision of the City’s Comprehensive Emergency Plan make this research appropriate. The literature review indicates the importance of immediate damage assessment, and identifies that what the City is practicing today is outdated and ineffective. Damage assessment procedures should be

developed in a standardized format, and include all the components as identified by the authors reviewed in this document.

The literature review now serves as the basis for this author's personal research into the topic. Each research question will be addressed, and a comparison can be drawn based upon this new research data. Discussion will follow, from which recommendations can be formulated and a draft procedure written.

Procedures

The focus of this research is to determine the components of an immediate damage assessment procedure that includes processes that are commonly found in fire department standard operating procedures throughout the industry and around the world. In an effort to develop an effective and efficient procedure for the San Gabriel Fire Department, a literature review was conducted to review the work of other researchers. From this, the author was able to develop two questionnaires to look further into the factors affecting the development of an immediate damage assessment procedure in other fire agencies, and specific to the SGFD.

External Questionnaire

The literature review was used to develop a questionnaire on immediate damage assessment that focuses on the last two research questions in particular. For the purpose of this research, questionnaires were sent on August 9, 2011, via email, to 538 current and former Executive Fire Officer Program students representing departments of all types and sizes across the country. The questionnaire was titled the *EFO ARP – EAFSOEM (Year 3)* (Appendix E). The survey group was electronically contacted through an email contact list obtained from a list of contacts used by a fellow EFO graduate.

The subjects of the external questionnaire were current participants and graduates of the EFO program, and selected because these subjects have a higher reliability of returning a completed data set to the researcher. Since the subject of damage assessment is relevant to nearly every jurisdiction in the United States, this author did not determine a need to filter the participant list by using the common filtering factors like jurisdiction size, type or location. The literature review indicated that while the disasters may range in causes, the immediate damage assessment process is the same in each. This was also witnessed first hand during the EAFSOEM course simulations, as the same process was successfully used in all disaster scenarios.

The media used for the online questionnaire development and collection was the survey website SurveyMonkey®. SurveyMonkey® provides the user with a unique link that can be pasted into an email and distributed to the survey subjects. The researcher attempted to make the questions as objective as possible, adding clarifying detail to many of the YES/NO questions so that the subject would more easily understand the intent of the question and response. The external survey had no open-ended questions, but several questions had the option to add comments after selecting a multiple-choice response. Subjects who did not conduct any damage assessment were forwarded to the final question of the survey, since none of the questions that followed would garner a reasonable response. This was done primarily to reduce confusion during data analysis. A sample questionnaire was reviewed by a non-fire service person to ensure its ease of use, clarity, and overall functionality. The results of the sample were deleted from the analysis section on the website, and the instrument was distributed to the actual subjects. Of the 438 emails that were sent out, 122 were returned ‘undeliverable’ for a variety of reasons; therefore, it is assumed that 316 recipients actually received the initial email request. The

participants were given three (3) days to complete the survey; 91 questionnaires, or 28.8% of the total disseminated, were completed at the end of this period.

Each of the questions within the instrument was written based upon information discussed in the literature review, or one or more of the research questions. The literature review left this researcher with little information from the actual field officers using a damage assessment process, but rather it provided a general look at damage assessment, some of which may be considered “perfect world” theories. Limiting the subjects of this questionnaire to EFO participants provided a survey group in which many were familiar with the EAFSOEM course, and therefore able to understand the concept of damage assessment.

This questionnaire was designed to gain a user perspective, as well as seek information into the sources referenced during the development of standard operating procedures for damage assessment in a wide variety of agencies. The lack of literature related to end-user problems and the unique informational needs of the first arriving company officers makes the questionnaire extremely necessary to obtain the goal of this applied research paper. The questionnaire included questions related to four specific areas, and included:

1. Basic Information included the name of the department including the state and the population served by the participant’s agency. The final question in this section asked if the participant’s agency had a formal written policy or procedure for post disaster damage assessment. Respondents who selected the answer “No – We do not conduct damage assessment” were forwarded to the end of the survey, as none of the survey questions were relevant to agencies that did not conduct damage assessments.

2. Components of jurisdictional immediate damage assessment procedures followed the general information section. This data will be compared to the data components discovered in the literature to verify that the written material is actually useful in the field.

3. The next section sought information about the data collection process. The literature review specified that a data collection process is essential, however that particular process was vague and varied from author to author. Three questions required the subject to provide information about the use of standardized forms, what criteria such forms may have been based upon, and the use of electronic collection systems.

4. The literature also indicated that training and exercises were a necessary to ensure that the process was successful. The next question asked for information regarding the extent of training and exercises of the damage assessment process.

5. The procedure development process, including using a community profile, risk assessment, hazard identification, resource evaluation, and data collection was evaluated in the next section, to determine the process behind the procedure development.

6. Drive routes were listed my numerous authors as a critical part of a damage assessment procedure. The researcher added a question regarding the use of specified drive routes on the district survey to determine how many agencies used a pre-determined route, and how many used another means to survey the area. This question is followed by two general questions that sought additional information the subject might offer regarding the topic, and requested a copy of policies or procedures specific to the topic.

Though the external questionnaire may have provided a broad perspective on immediate damage assessment procedures, the author found it necessary to delve further into the specific issues of post disaster procedures as they related to the San Gabriel Fire Department and its' officers.

Internal Questionnaire

The San Gabriel Fire Department policies and procedures governing immediate damage assessment were examined in the literature review. After review, it became clear that the policy in the SGFD Operations Manual was outdated, as the procedure called for would not work due to operational changes that took place in 2000. This provoked this author to develop an internal questionnaire that looked at many of the same general subjects as the external questionnaire, but in much more detail. At the time of this research the SGFD had three chief officers (a fire chief and two battalion chiefs, though one battalion chief is on administrative leave), seven captains, including this author, and seven firefighters or engineers serving in the acting captain capacity. Any of these seventeen officers (or acting officers) were in a position where they would be responsible for one or more parts of the damage assessment process; they could be in the field collecting data, or in the EOC/command post receiving the data. It was therefore reasonable to assume that the better coordinated those individuals are, the better the outcome would be in the event of a disaster.

For those reasons, this author chose to develop a second, internal questionnaire using the same SurveyMonkey® internet service, and the same process to create, distribute, collect and analyze the data. On August 9, 2011, the questionnaire titled, *EFO Damage Assessment Internal Questionnaire* (Appendix F), was distributed via email. The email and the questionnaire described in detail the research purpose, and requested a prompt response. Further, individuals

selected were also personally contacted by telephone, or in person, and reminded to complete the online questionnaire. The response was due in 3 days, on August 12, 2011. There were seventeen questionnaires distributed, and it was assumed that all participants received the email. When the data was analyzed, it was determined that eleven of the seventeen were returned (64.7%).

The purpose of the internal questionnaire was to obtain a snapshot of where the department's officers (and acting officers) were on the subject of immediate damage assessment. The seventeen surveys distributed represented 50% of the department, a significant population considering the scope of the project. The questionnaire sought to gain insight into the current employees' opinions on the following topics:

1. Current Knowledge: The officer's current knowledge of the procedures to be followed after a major disaster in the City. This answer required a typed answer that, while generally more difficult to evaluate due to a larger number of respondents, was perfectly suited for a smaller group such as SGFD officers. The scenario used here was a major earthquake, in an attempt to develop more consistency in the responses. A follow up question asked what the response to the first question was based on, and the answers were multiple choice selections.
2. Training/Exercises: To be consistent with the theme of training in the external survey, the next two questions asked the subjects to describe their personal training, if any, in post disaster protocols/procedures. An evaluation of the value of the City wide annual disaster drill with respect to its ability to prepare the first responders for immediate damage assessment followed, as a multiple choice question.
3. Current Level of Preparedness: Two questions attempted to gain insight into the officers' current thoughts on how they saw the department's preparation for response after a

disaster. Both questions specified that the answer was to reflect the situation "today," and included a YES/NO response, plus a text box asking them to describe the reason for their answer. The first of these questions asked about the ability to respond effectively and efficiently under the current policies, and the second made reference to the consistency of evaluating target hazards and infrastructure.

4. Procedure Development: Three of the final four questions asked the subject to evaluate the value of an immediate damage procedure, if they understood how damage assessment fits into the overall incident command system on a disaster (why it is really done), and whether they believed the SGFD has a defined process for determining target hazard locations in the City.

The final question allowed the respondent to provide any additional ideas that they believed would make the immediate damage assessment, a low-frequency event, easier to complete in the most straightforward and consistent method. This information could be used to develop a draft standard operating procedure.

Limitations

One limitation to the use of a questionnaire was the responding participant's knowledge of their agency's immediate damage assessment program, and the fact that numerous factors could influence a person's opinion of the system that they currently used. It was also assumed that each respondent interpreted the question as the author intended. While the questions and response options were developed to obtain a specific range of responses, the respondent's specific job description, rank or title may have precluded them from providing the most educated or informed answer.

The internal questionnaire posed several limitations that were linked primarily to the lack of a complete and up to date operations manual. Without policy or procedures, members of the SGFD often reverted to several sources when faced with a decision on how to react/respond to a low frequency situation like a disaster. One way they may react is to do what they have seen others do, even if that was 20-30 years ago. That said, the response to how immediate damage assessment fits into the overall management of the incident might reflect the way it fit 20 years ago, but not necessarily the intent of damage assessment in an incident today. Lack of training and experience in a disaster added to this limitation, as it potentially narrowed the perspective of the questionnaire participant.

Results

The results of the research represented a detailed study of a number of specific aspects of immediate damage assessment. Through the research procedures previously discussed, the author has attempted to uncover the answers to each of the four research questions to fulfill the purpose of this applied research paper.

External Questionnaire of Damage Assessment

The external questionnaire asked 12 questions in a combination of single and multiple response questions through a web-based survey instrument on the SurveyMonkey® website. There were a total of 91 surveys returned by the deadline of August 12, 2011 at 1800 hours. Three additional surveys were received after the deadline, and that data was not included in this research. The results included responses from 91 fire personnel in at least 76 different agencies across the United States. Ten respondents failed to provide their department/agency name, and five were members of the same department. There was a wide variation of populations served by

these agencies, with four agencies serving less than 10,000 people, and 13 serving a population greater than 500,001. Thirty respondents were from agencies serving 10,001 to 50,000, which was the greatest percentage of responses, and was the same range that the San Gabriel Fire Department served. Finally, there were 18 responses that indicated that their jurisdiction did not conduct any type of damage assessment, and these participants were directed to the end of the survey, so as not to skew the results by answering the questions pertaining to the damage assessment process.

Components of an Immediate Damage Assessment Procedure – Other Agencies

The intent of the external questionnaire was to answer research question number 3, which asked how other fire departments addressed and/or conducted immediate damage assessment/windshield surveys. There were eight questions that delved into this topic, and the results of these follow. Participants were asked which components, from a list provided by the author, was part of the immediate damage assessment in their jurisdiction. Fire Department Resources, which included firefighter casualties, damage to fire department structures and vehicles, and the fire department's ability to respond was the leading component, as 87.7% reported in their responses. This was followed by Life Safety, Rescue Problems, and Property Damage, which were included in responses 79.5%, 76.5% and 74% of the time, respectively. Every component listed as an option was selected, with Evacuation Sites occurring the fewest times, at 45.2%. Four responded that none of the components were part of their damage assessment process (Figure 1).

Figure 1: EFO ARP – EAFSOEM (Year 3), Question 4 Responses

Which of the following is part of the immediate damage assessment in your jurisdiction? (MARK ALL THAT APPLY)

Answer Options	Response Percent	Response Count
FIRE DEPT RESOURCES - including firefighter casualties, damage to structure and/or vehicles, ability to respond	87.7%	64
LIFE SAFETY - Including number of injured and killed (rough estimates or exact)	79.5%	58
RESCUE PROBLEMS - Including those trapped and recommendations for resource needs	76.7%	56
PROPERTY DAMAGE - Including the number of buildings damaged in a specific area (blocks, etc)	74.0%	54
EXTENT OF DAMAGE TO PROPERTY - i.e. Destroyed, Major, Minor, etc.	68.5%	50
INFRASTRUCTURE ISSUES - Including utilities, roads, etc	76.7%	56
AGENCY/JURISDICTION PROPERTY - Including town/city hall, public buildings, schools etc.	54.8%	40
TARGET/SPECIAL HAZARDS - Including major businesses, large facilities, industrial sites	68.5%	50
HEALTH - Including hospitals, health care facilities, etc.	56.2%	41
PUBLIC HEALTH - Including sewage systems, etc	43.8%	32
TRANSPORTATION - Including waterways, rail lines, and major roadways/highways, tunnels, bridges, that may affect ingress/egress from the area.	58.9%	43
EVACUATION SITES - Including pre-determined evacuation areas	45.2%	33
NONE OF THESE	5.5%	4
Additional Fields		0

As the literature review suggested, standardized forms simplify field reconnaissance and streamline the flow of information from the field to incident management teams and/or the EOC. When asked if a standardized form or checklist was used when conducting damage assessment, 63.9% reported that they did not have a standard form. Three stated in the following comment section that their agency was working on the development of a form, and another stated that the information was entered into a web based electronic reporting system. Seven others (9.9%) responded that their agency used an automated/electronic method of collecting and sharing damage information.

The literature also suggested that a number of standardized forms were available from State and Federal resources. When asked to choose from a list which type of form was used (including the option to select "I don't know," "Other" and none), 25 participants answered the question. Of those, 48% described their forms as "agency created", and 20% used a federal form. Three, 12%, used a state form, and one used a combination of FEMA and local forms (Figure 2).

Figure 2: EFO ARP – EAFSOEM (Year 3), Question 6 Responses

Do you know if your agency uses a State or Federal standardized form for collecting Immediate Damage Assessment information?

Answer Options	Response Percent	Response Count
YES - It is a State Form	12.0%	3
YES - It is a Federal Form	20.0%	5
YES - BOTH Federal and State forms are used	8.0%	2
YES - I don't know which though	0.0%	0
NO - We write information on our own agency created form	48.0%	12
NO - We collect information on any type of paper	0.0%	0
NO - We don't write anything down	0.0%	0
I DON'T HAVE ANY IDEA WHAT WE DO	4.0%	1
Other (please specify)	8.0%	2
	answered question	25
	skipped question	69

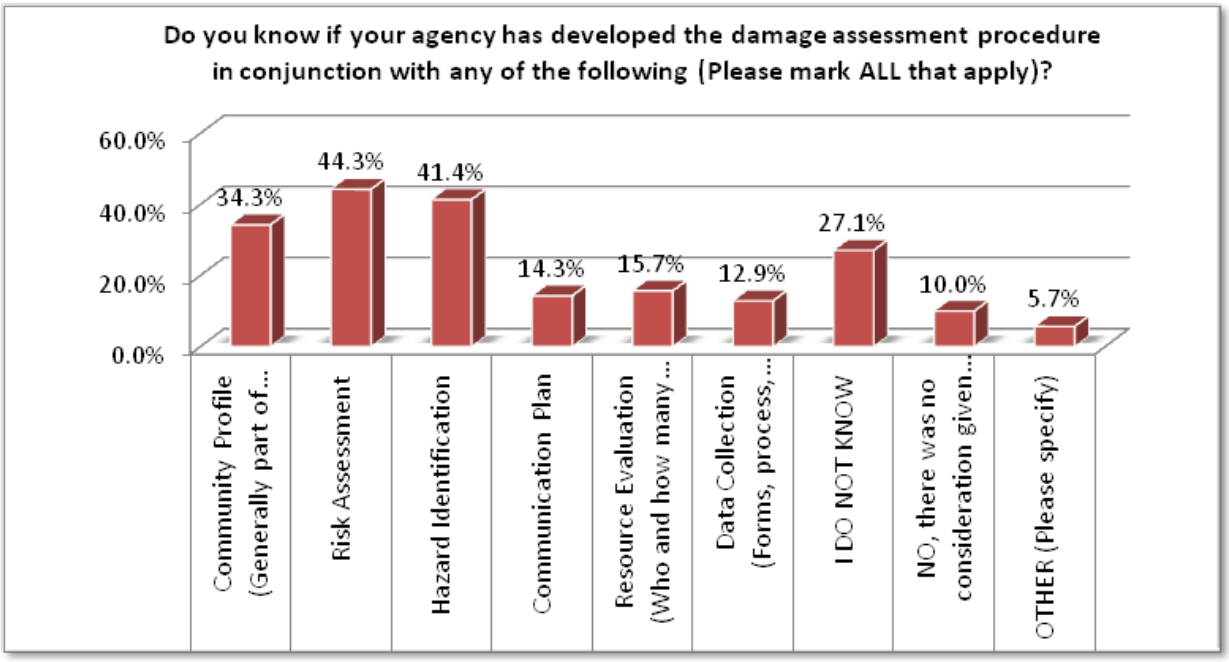
OTHER:
we use a FEMA form and augment it with forms we have created
locally formulated

Training was also a common theme in literature reviewed, and while not part of the actual procedure, training and exercises were clearly identified as critical in the success or failure of a damage assessment policy. The author asked participants to describe their agency's use of training, exercises, both training and exercises, or neither, related to immediate damage assessment. Nearly half, 47.9% responded that they do not train or exercise the damage

assessment procedure, while 18.3% used training only, and another 18.3% provided both training and exercises. The remaining 15.5% conducted exercises only.

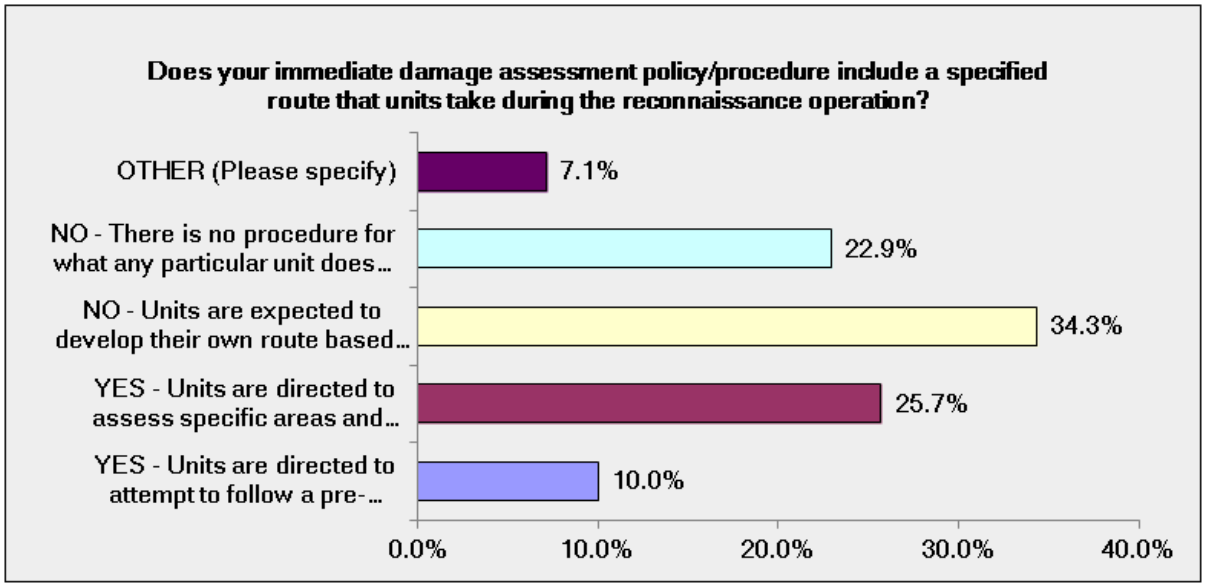
In the literature review, the author discovered that the National Fire Academy outlined a formal process for the development of a damage assessment procedure. The author included these steps in a question to participants to determine the extent to which these processes were being, or had been, practiced by agencies that had conducted damage assessment. While 44.9% reported they had used risk assessment in conjunction with damage assessment plan development, the numbers for the other steps was much lower. A number of respondents did not know what the damage assessment procedure involved (26.1%), and 10.1% reported that none of the NFA steps were considered (Figure 3).

Figure 3: EFO ARP – EAFSOEM (Year 3), Question 9 Responses



Several different authors mentioned travel routes in the literature review, and this author asked subjects to indicate what type of route, if any, their field units followed during the reconnaissance operation. Nearly 35% responded that the units in the field were expected to develop their own route based upon the situation, while 26% were required to assess specific areas, but not required to follow a specific route. Still almost 22% responded stating that they had no procedure for what units were required to do during immediate damage assessment, while only 10% were directed to follow a pre-determined route (Figure 4).

Figure 4: EFO ARP – EAFSOEM (Year 3), Question 10 Responses



San Gabriel Fire Officers – Internal Questionnaire

The external questionnaire provided this researcher with data that summarized the procedures in place in fire departments across the nation. What the external questionnaire failed to provide is data related directly to the San Gabriel Fire Department, which is the focus of this research project. For the author to develop a draft SOP on immediate damage assessment for the SGFD, it was logical to develop a questionnaire that sought input into the inadequacies of the

current procedure and policy, a perspective on the willingness of the department's officers to see a new procedure written and put in place, and gain an idea of areas that should be incorporated into a new SOP. The internal questionnaire, *EFO – Damage Assessment Internal Questionnaire,* provided the author with an in depth assessment of the current knowledge of the policy, the preparation of the department employees at the time of research, the need for an SOP, and the components important to SGFD officers.

The questionnaire also answered research questions 1, 2 and 4: (1) What is immediate damage assessment and why is it a critical step in disaster mitigation? (2) How is immediate damage assessment addressed by the San Gabriel Fire Department in its current disaster plan and policies? And (4), What are the critical components of an SOP for conducting immediate damage assessment/windshield surveys? The link to the SurveyMonkey® website was sent to 17 officers- chief, battalion chiefs, captains, and acting captains (firefighters and engineers). Eleven officers responded to the request (64.7%); two battalion chiefs, four captains, three engineers/acting captains, and two firefighter/acting captains. At the time of this research, the SGFD had 28 employees; the responses represented over one-third of the department (39.3%).

In respect to the officers' current knowledge of the existing policies in place, a text answer was requested that asked each person to describe the procedure that he would perform if a major earthquake occurred "right now." Ten of eleven responded that they would have completed a district assessment, with two mentioning that they would have checked target hazards. Five stated that they would have checked their personnel for injuries, and the station for damage before the district assessment. Three mentioned that they would have "set up the EOC," and one replied that he would have "video [taped] all the damaged buildings and [made] an estimate of the damage to each and every one…" (Figure 5).

Figure 5: EFO – Damage Assessment Internal Questionnaire, Question 2 Responses

Please describe in writing, to the best of your knowledge RIGHT NOW, what the SGFD procedure is following a disaster (in general). Essentially, if a major earthquake struck right now, what are you supposed to do? (You do not need to include any Verdugo radio protocol).
Response Text
Go drive our districts and report any damage.
Move the engine outside of the apparatus floor. Begin to drive throughout the city assessing the damages.
If on duty, all apparatus is to be removed from apparatus floor / out of barn and readied for response. A recon of each station's "first-in" area are to be completed. Info gathered is to be relayed to the appropriate entity. (ie. Verdugo, EOC) Off-duty personnel are to be ready to come into work if needed and respond to work as safely and spedisiously as possible.
depending on the size and context of the disaster, as the EOC director, I would be required to respond to the EOC after securing my family. Other members are to call and check in, or in the absence of communication, respond to Station 51 as soon as practical.
If not on duty I am supposed to call in as an available disaster worker. On-duty, my engine company is supposed to take a damage assessment of the personnel, apparatus, and station before going out and driving around to gather a damage assessment of the community and target hazards. That's my understanding.
Gather information on event; Check crew and equipment; prepare for after-shocks; assess district; Triage needs; report actions; request needs; EOC set-up/Operations
Check station personnel and equipment for damage. If OK the do a response district survey for structural damage and possible casualties. This is a survey, no treatment is done in this phase, just triage.
Set up the EOC then drive our first in district unless be receive calls for assistance. Fire calls are to handled asap and then medical calls. We r to video all the damaged buildings and make an estimate of the damage to each and every one including the city owned buildings also. If i was in the north area of town i would check the Hospital 1st to make sure they could handle ems calls and that the emergency generators are operating and online. If damaged buildings are found we should use our fire line tape to keep people away from the area. Report back to the EOC of the B/C on duty. If something happen during the day time hours I would check all the schools in my area also..
It is my understanding that our responsibility post disaster is to do an initial damage and life safety assessment and report, triage and start rescue efforts based on initial findings.
Go into Verdugo EArthquake mode, BC dispatch on red 9, check personnel and clear station and survey district
As a Company officer I would first make sure that my crew is safe and have all apparatus pulled out on the apron. I would check the over all safety of the building and communicate my findings to the BC. Drive through my district and check on major target hazards and report my findings to the BC. Respond to emergency calls and assist with the set-up of the EOC.

The author followed the last question by asking what they based their answers on, to determine how many officers based their response to following the policy (or what they believed was the policy). Three of eleven stated that they were (or thought they were) following the policy, while three others responded by selecting “following direction – somebody told me to do it that way” and two others chose “common sense” as their justification. The responses to the last two questions addressed the second research question from the perspective of how the SGFD officers believed the procedure was supposed to work.

The next two questions addressed the preparation aspects, training and exercises, as they were related to research question 4: components of an SOP. Only one respondent stated that he had courses in emergency management outside the department, while others (3) stated they had no training in post disaster procedures/protocols from SGFD, and two others replied that they had little training. Two stated that the only training was from Community Emergency Response Team (CERT) training and two others included Urban Search and Rescue (USAR) training and drills. Three participants included prior EOC drills as the only training they had in post-disaster procedures.

The following question asked the participant to evaluate the value of the annual disaster (EOC) drill on its’ relevance to damage assessment procedures. Only one believed that the drills gave participants experience in windshield assessments, while three reported that they have never attended a drill. Three others believe that the focus of the drill was not on first responders, and four responses claimed that though they learned things at the drill, fire department field operations were not part of it.

The author believed that before an attempt was made at creating a new procedure on immediate damage assessment, its successful implementation would only occur with an interest from the department, particularly its officers. The next three questions focused of the need for revision, and addressed research questions 1 and 2. The questionnaire participants all (100%) agreed that if a major disaster (earthquake was used in the questionnaire question) struck now, that the SGFD is not adequately prepared to respond efficiently and effectively (Figure 7). Responses also included their justification for why they did not believe the department was prepared. The responses were candid, and will provide insight that can serve as the driving force behind the procedure development.

Question 7 sought to determine to what extent SGFD officers understood how the immediate damage assessment fit into the overall response phase of a disaster, or why it was done. Five respondents chose the answer, "YES – I know exactly how it fits into the overall operation, including where the information I collect goes and how it is used." Six responded by selecting "NO – I know that we are asked to do it, but I can't say I have a thorough knowledge, or I could only simply assume, how the information gathered is used" (Figure 6).

Figure 6: EFO – Damage Assessment Internal Questionnaire, Question 7 Responses

Are you aware of how immediate damage assessment (windshield survey) fits into the overall response phase of a disaster event? (Do you understand the significance of the information collected or why it is done?)		
Answer Options	**Response Percent**	**Response Count**
YES - I know exactly how it fits into the overall operation, including where the information I collect goes and how it is used.	45.5%	5
NO - I know that we are asked to do it, but I can't say I have a thorough knowledge, or I could only simply assume, how the information gathered is used.	54.5%	6
	answered question	11
	skipped question	0

Figure 7: EFO – Damage Assessment Internal Questionnaire, Question 6 Responses

Do you feel that if a major earthquake struck the City today, that the SGFD as a department is adequately prepared to respond EFFICIENTLY and EFFECTIVELY with the current policies and procedures (if there are any) in place?		
Answer Options	**Response Percent**	**Response Count**
YES - We are prepared to be effective and efficient in response to a city-wide disaster TODAY.	0.0%	0
NO - We may struggle through it, but it would likely not be as effectively or efficiently as it could/should be.	100.0%	11

Why or why not?
I think it would be like many other things we do, management by crisis.
We don't have a procedure put into place to start things off right after a major earthquake. I feel we would just start to respond to the most immediate need.
At first, there may be problems figuring out what to do and when to do it. Once the incident progressed, however, I think the members would be fine.
A citywide understanding of ICS fundamentals is the key to EOC operations. Although we are close to having some semblance of coherent operations amongst the players in the system, until the next drill, this cannot be validated.
Because we are the fire department and that's what we do
Our plan is for a short term event. In a longer event (seven days of longer) the city would run out of supplies and resources without any outside assistance.
We do not have any SOP's on what should be done or in what order! My experience is my district and the hospital only by driving the whole city!!! Like i have said above already.
We don't have staff the department properly in order to respond efficiently. We would need to staff at least the USAR 5 and probably a reserve rescue and engine. Considering the age of our city and buildings there is a high possibility of wide-spread damage. With out proper staffing we will quickly be inundated.
we'll do as usual and perform to the limitations we are dealt, we need major support supplies for our residents as well as facilities to house and support these residents, we will be definitely overwhelmed but will do the best we can.
In my assessment of most diasters, no one is truly prepared to respond effectively. We need more training within our own city and greater interface with other area departments. With our limited manpower that needs to do so many things, I'm afraid that we would be rapidly over-taxed. For decades Japan has been touted as being the most prepared country in the world in relation to disasters. I think we should all take a lesson on how that system was over-taxed and that more training must be done to truly be effective.

Question 8 of the questionnaire received a 100% response that the SGFD officers believed that immediate damage assessment is deserving of a policy/SOP.

Research question 4, components of an immediate damage assessment procedure was addressed in the next three questions. Question 9 was an adaptation of the question asked in the external questionnaire wherein respondents were asked to select components of their damage assessment procedures. In the internal questionnaire, officers were asked which of those same components should be included in an immediate damage assessment procedure for the SGFD. Results of this question showed that assessment of fire department resources (firefighters, structures, vehicles and the ability to respond) and infrastructure issues (utilities, roads, etc.) were essential (100% responses), with health systems (hospital) closely behind at 90.9%, and life safety (number of injured or killed), rescue problems, property damage and city owned buildings (63.6%) following target and special hazard assessment (72.7%).

When asked whether a standardized form would provide for consistency and simplification of the assessment process, 100% of the respondents answered yes. Question 11 responses indicated that nine (81.8%) of the officers did not believe the current assessment practices would result in consistencies in the target hazards and infrastructure information collected in the field. Given the opportunity to explain their responses, most referred to the lack of a list of such hazards, lack of guidelines and “no universal understanding of the concepts of such a thing” as reasons for the overwhelming negative responses.

The final question on the questionnaire (Question #13) asked SGFD officers for ideas on other aides that could be incorporated into the SOP that would make the assessment process as

straightforward, consistent and simple as possible. Many of the written responses included checklists (81.8%), and an SOP was also mentioned several times.

Discussion

The results of the research conducted by this author support many of the opinions and research discussed in the literature review. The completion of the research by the author will allow the data to be compared to that information obtained from the literature review, as it all relates to the research questions. The discussion will compare and contrast the literature, and the opinions and knowledge of those subjects who completed the questionnaire. At the conclusion of this section of the research paper, recommendations will be formed, and a draft SOP written.

Damage assessment and why it is critical to response, mitigation and relief.

A look at damage assessment began with a review of other authors' works to determine what damage assessment is, and why it is so important to response, mitigation and relief following a disaster. FEMA (2009) described damage assessment as information gathering to determine the impact of a significant event on life and property. Several authors indicated that there are several types of damage assessment that must occur after a disaster, and, though different terms are used for those types, in general there is assessment immediately following the event, and assessment that occurs as the recovery effort plays out. This research covers the first assessment, which has been referred to by this author as *immediate damage assessment*.

McEntire (2002) adds that rapid (immediate) damage assessment is a snapshot of the results of an event, and that it gathers information related to human casualties, structural damage, and is generally performed in a vehicle (also called a windshield survey). He emphasizes his point stating that it is the single most important function following a disaster.

The challenges that follow a disaster are evident when a damage assessment plan is not prepared, reviewed and practiced prior to a disaster occurring. The intent of damage assessment, to provide a global perspective of the situation, is never realized, and information gathered is often more pertinent to the agency gathering it, than it is to the overall needs of the incident managers (Auf der Heide, 1989). The internal questionnaire validates Aud der Heide's statement, as the results prove that 100% of those questioned about the preparedness of the San Gabriel Fire Department state the department is not adequately prepared. Justification for those answers include the following statements, and in Figure 7:

- "I think it would be like many other things we do, management by crisis."
- "We don't have a procedure put into place to start things off right after a major earthquake."
- "Our plan is for a short term event."
- "We need more training within our own city…we would be rapidly over-taxed."

Further emphasizing the importance of a standard operating procedure for immediate damage assessment is the SGFD officers' unanimous response that the department should develop such a policy/procedure.

The State of California's emergency management agency, CalEMA (2009) has set goals and priorities for the response phase of a disaster, which include mitigating hazards, meeting basic human needs (goals), and life, health and safety, property and the environment (priorities). Both questionnaires (internal and external) support these priorities, as respondents overwhelmingly select similar components as part of the immediate damage assessment procedure. Finally, CalEMA clearly states that damage assessment must be completed to assure

that all resource requests give a clear description of the situation, and the nature of service that state resources will provide (2009). In a widespread disaster, such as an earthquake, resource availability will remain at critically low levels for the first 72 hours of the incident. The sooner information on the local situation is obtained, the sooner requests for scarce resources can be made. In a small jurisdiction like San Gabriel, external resources are essential for response, relief and recovery efforts.

How the San Gabriel Fire Department currently addresses damage assessment.

The literature review reveals several policies and procedures that guide the actions of San Gabriel Fire Department officers following a disastrous event. Unfortunately, the current policy in the operations manual of the SGFD, *Disaster Operations: Post Disaster Activity*, has been shown to be outdated, unknown, and seldom adhered to by SGFD personnel. In the internal questionnaire, numerous responses indicate that knowledge of the policy is lacking. Question 2 asked officers to describe what action they would take after a major earthquake, and each of the 11 responses is different, even though several have similar components. This clearly indicates a lack of consistency, which leads to an inefficient and ineffective operation and poor outcomes.

On a local operational level, the most concise and current procedure available to SGFD officers in the event of a major emergency/disaster is the operations manual of the Verdugo Fire Communications Center (VFCC). Though this manual provides no details for the operations of the San Gabriel Fire Department other than communications procedures, it makes clear the fact that each jurisdiction is responsible for controlling its own resources in the event of a major emergency. This conflicts with the outdated (but currently in place) SGFD policy, which states that units will be dispatched as needed, and report the damage found in their respective districts

to “dispatch.” The policy, though undated, was written well before the San Gabriel Fire Department began contracting dispatch services with VFCC in April 2000. Prior to this point, SGFD dispatched units in-house, and this policy was reasonable at that point in time.

While the current SGFD policy contains a drive route, it is obvious that not one of the officers questioned is aware of this fact. Reviewing the drive route quickly reveals that it, too is out of date, and lacks any description of target hazards or infrastructure to be assessed, as those have changed drastically in the last 10 to 15 years. The internal survey also shows that there is not likely to be any consistency in target hazard assessment, as a formal list of such hazards does not exist, leaving those assessments at the discretion of the officer on duty at the time of an event. Further complicating matters is the fact that the questionnaire reveals that over half of the SGFD officers do not even understand how damage assessment fits into the overall disaster operation. Lack of understanding with respect to the reason a task is done makes consistency more unlikely, and decreases the efficiency and effectiveness of the entire response and relief operation.

The *City of San Gabriel Comprehensive Emergency Plan*, (San Gabriel, 2011) is the most updated policy with regard to emergency management. However, the plan simply states in several places that damage assessment will be conducted. While it refers to damage assessment as a responsibility of the building department, Battalion Chief Bryan Frieders (SGFD) states that the damage assessment referred to in the plan is not the immediate damage assessment (windshield survey) for which the first responding emergency service workers will be responsible. He agrees with the author that while a policy or SOP needs to be developed for the department, it will not be part of the comprehensive plan (B. Frieders, personal communication, August 1, 2011).

The existence of several policies and procedures related to emergency and disaster operations for the San Gabriel Fire Department fails to adequately prepare the personnel of the department for a response. This is shown through the results of the questionnaire, and the literature of other authors further indicates that certain failures in response will occur should a disaster occur before a procedure is written, accepted, implemented, and personnel are trained and exercises are conducted. While indications are that this subject is a worthy undertaking, numerous steps remain before the preparedness levels improve, however, it is far from beyond reality and reasonably attainable in the next 12 to 18 months.

How other fire departments conduct damage assessment.

An external questionnaire was developed by the author to determine how other American fire agencies conduct immediate damage assessment. The data obtained from this questionnaire provides great insight to this author, which will allow the policies, procedures, best practices, case studies and experiences of the authors included in the literature review to be compared to the procedures and field experiences of those who currently have plans in place. Many of those who responded to the external questionnaire have experience using the immediate damage assessment procedures in disaster situations, including Hurricane Katrina and other storm situations- flooding, tornadoes, and earthquakes. Such experience is invaluable to this author, as the San Gabriel Fire Department has yet to exercise a procedure, and has, thus far, escaped major disaster experience.

Strickland (1996) describes the windshield survey concept used by Fairfax County Fire and Rescue Department (VA) that was based on the same sort of procedure common in California departments for use after earthquakes. Used for different types of emergencies in

Fairfax County, the procedure includes units driving a pre-determined route, assessing life risk, fire potential, hazardous material problems, infrastructure and transportation route damage. The information is passed to the battalion chief and then it is relayed up the command/management system. Strickland stresses the importance of completing the area survey before committing resources to specific locations, and he strongly believes that fire department officials are the most qualified to provide the information collected in an immediate damage assessment.

Numerous agencies, including Los Angeles County Fire Department, include life safety, property and the environment as priorities for field units (PVAN, n.d.). While Los Angeles County fire companies conduct a jurisdictional survey, the Los Angeles City Fire Department provides reconnaissance on small to moderate events. In a large-scale disaster, the City of Los Angeles emergency plan calls for other city departments to perform damage assessment, which allows the fire department to remain committed to emergency response only. The City of San Gabriel does not have the staff to operate in this fashion.

Executive fire officer students and graduates questioned in the external questionnaire indicate that overall, training and exercising immediate damage assessment protocols is lacking. Nearly half (47.9%) state that their agencies do not train, nor do they exercise the damage assessment procedure, while 18.3% (each) use training or training and exercises, and only 15.5% conduct exercises only. While several authors emphasize the importance of training and exercises, the research does not support this, and actually indicates that training or exercises don’t happen more often than they do happen.

The literature review also indicates that data collection and standardized forms can impact the effectiveness of the information collection and flow through the management system.

While the literature provides a number of standard forms through FEMA and other Federal and State agencies, 48% of those who responded to the external questionnaire report that they use a form created by their own agency. Twenty-four of 25 who answered the question report that they use some type of form to collect data from the immediate damage assessment. The SGFD does not have an updated, relevant form to use at this time, however the internal questionnaire shows that 11 of 11 officers report that a standardized form would provide for consistency, and would simplify the damage assessment process.

Critical components of an immediate damage assessment procedure.

The first three research questions were intended to provide background and supporting evidence for the development of a new standard operating procedure on immediate damage assessment. The final research question, the critical components of an immediate damage assessment procedure, sought to determine those components that are not only part of a federal or state agency's recommendations, the best practices as stated by subject matter experts whose writings were reviewed in this paper, or the personal opinions of those individuals responding to the author's questionnaire, but rather a combination of all of these. A substantial effort was made to determine not only what is recommended, but what is used in the field and actually works.

The critical components discussion can be divided into four sections: addressing challenges, the pre-development process, developing the procedure, and post-implementation steps. McEntire (2002) references three challenges to those conducting damage assessment protocols, based upon his observation of a number of disasters and the subsequent response and relief efforts. Addressing these challenges seems the best first step in the development of a new SOP, as it establishes the principles upon which the procedure is developed. McEntire offers four

principles that the author believes are essential to a successful process and product: (1) engage in preparedness activities (planning, training and exercises), (2) establish a plan that coordinates actions between all individuals, (3) develop functional organizations and teams, and (4) emphasize accurate appraisals and reports to state and federal authorities (2002).

Planitz emphasizes preparation before the disaster, a crucial step that has yet to be taken by the San Gabriel Fire Department, as evidence from the questionnaire indicates. McEntire and Cope state that success in Paso Robles, California following an earthquake was directly related to planning, training and performance (2004). Immediate damage assessment involves developing more than one plan and procedure (pre-development processes), including several major steps that must be taken before an immediate damage assessment procedure can be formulated (NFA, 2008). These steps include a conducting a community profile, risk assessment and hazard identification, developing a communication plan, conducting a resource evaluation (number of personnel on duty, subject to call, etc.), and creating a data collection process and organization.

The external questionnaire asked respondents to identify which, if any, of these processes is part of their damage assessment procedure development. Though they are a recommended part of the procedure development, only the community profile, risk assessment and hazard identification are part of many procedures. Without communications, resource evaluations, and data processes to collect and share information, immediate damage assessment cannot be completed as effectively as possible.

Once the pre-development steps have been completed, the creation of the procedure can begin. In an effort to gain as much outside information as possible, the data attained from both

surveys, and prior studies, research, experience and recommendations from the authors reviewed in the literature review can be combined to establish a list of components of the actual immediate damage assessment procedure. The Emergency Management Institute (EMI) identifies the following major categories of information that must be gathered by field units during immediate damage assessment: life safety, status of lifelines, status of essential facilities, status of access routes, major problems by sector/district, and status of resources. EMI also states that gathering too much information is too taxing on the data recording process (1995).

Figure 8: Comparison of components: External Questionnaire results, Internal Questionnaire results, EMI recommended major category.

Assessment Component	External	Internal	EMI Category
FD Resources - Inc. FF casualties, damage to structure and/or vehicles, ability to respond	87.5%	100.0%	Essential Facilities
Life Safety - Inc. # of injured and killed (estimates)	79.2%	63.6%	Life Safety
Rescue Problems – Inc. those trapped, in need of evacuation and resource needs	76.4%	63.6%	Life Safety
Property Damage – Inc. # of buildings damaged in a specific area (blocks, etc.)	73.6%	63.6%	Major Problems
Extent of Property Damage - i.e. Destroyed, Major, Minor, etc.	68.1%	54.5%	Major Problems
Infrastructure Issues - Inc. utilities, roads, etc.	77.8%	100.0%	Lifelines
Agency/Jurisdiction Property - Inc. town/city hall, public buildings, schools, etc.	55.6%	63.6%	Essential Facilities
Target/Special Hazards - Inc. major businesses, large facilities, industrial sites, etc.	69.4%	72.7%	Imminent Hazards
Healthcare – Inc. hospitals, health care facilities etc.	56.9%	90.9%	Essential Facilities-Hospitals
Public Health - Inc. sewage systems, etc.	44.4%	45.5%	
Transportation- Inc. waterways, rail lines, major roadways/highways, tunnels, bridges; that may affect ingress/egress from the area	59.7%	72.6%	Access Routes
Evacuation Sites - Inc. pre-determined evacuation areas	45.8%	63.6%	Essential Facilities-Shelters

The author posed the same question to both internal and external questionnaire recipients- which of the following components should be included in the damage assessment procedure? The results of the survey question are found in Figure 8, which compares both sets of questionnaire participants, and categorizes each component into one of the EMI categories. The components listed in the questionnaire fit into one of the EMI major categories, with the exception of the public health component. Though it could be considered a “major problem” by EMI definition, it is also the least selected component in each survey, gathering just 44.4% and 45.5% of the responses, and wouldn’t likely remain part of the final procedure.

Following the development of the SOP on immediate damage assessment, it must be reviewed, adopted, and implemented. Training and exercises are a critical part of implementation of a new procedure. Successful implementation includes an evaluation process (hopefully following an exercise before an actual event), and revisions can be made as necessary. While both surveys indicate that training and exercises are severely lacking in most agencies including San Gabriel Fire Department, the investment of training and exercising damage assessment procedures increases the effectiveness and efficiency of the process (McEntire, 2002).

In conclusion, the current state of the damage assessment procedure at the San Gabriel Fire Department is in need of revision, which must start with planning and other pre-development processes, and end with training and exercises. This author is prepared to dedicate the effort required to see this project through to completion, based upon the findings of this research, and the support of department administration. Both the literature reviewed, and the data collected from the author’s original research indicate that immediate damage assessment has the potential to increase efficiency and effectiveness in post disaster response, relief and recovery, and provide for enhanced life safety, property conservation, and environmental protection.

Recommendations

Developing an immediate damage assessment procedure that is efficient, effective, that provides critical data to incident managers requires commitment of every member of the organization. Commitment to the project must start at the top of the organization, with the full engagement of the fire chief, and the unwavering support of his staff and the company officers. The importance of a standard operating procedure for immediate damage assessment must be made real through training and exercising the SOP before it is needed in a true disaster. As the National Fire Academy (2009) reminds us, developing a damage assessment procedure during the event will lead to problems and an ineffective response, enhancing the chaos inherent to disaster events.

The first recommendation that the author makes is that the Fire Chief and Disaster Program Manager (Battalion Chief) consider using this research and the attached draft SOP as a basis for further enhancement of the immediate damage assessment procedure. The involvement of department members will be essential to the successful implementation of the SOP, and, frankly, will lead to a better final product.

Once the employees are engaged in the project, the department can begin to refine the details of the procedure, and tailor them to the specific needs of the organization. Based upon the findings of this research, the following recommendations are made:

1. The Fire Chief fully commit to supporting the development of an immediate damage assessment procedure including, but not limited to: (a) the establishment of a formalized, written policy or standard operating procedure, developed with input from all levels of the organization, and based upon the recommendations of the end users, (b) the

development of all members of the department through a formalized training program, including field exercises, (c) the financial support of this project, through traditional and progressive funding sources, (d) ensuring compliance with the standards set forth, ensuring continuous quality improvement, and consistency now and in the future.

2. A work group comprised of members from several levels of the organization should be formed to develop the Immediate Damage Assessment Standard Operating Procedure. The group would be responsible for completing each phase of the development process, as stated in the discussion section of this paper, and as recommended in this section.

3. A risk assessment and hazard identification process should commence using the community profile as a baseline. The results of this step will be used in the creation of a set of locations in each district that must be assessed during immediate damage assessment. The use of GIS services through Verdugo Fire Communications and the City of San Gabriel Community Development Department may prove a viable source of information and technology.

4. A resource evaluation must be completed to assess the staffing available on duty, off duty, and in other departments (police department) who can be used to assist in the completion of immediate damage assessment if fire resources are not available for any reason.

5. A consistent data collection process must be established, including standardized forms that can be used by both field units, and incident managers in operations and in the EOC. Data collection points must be consistent, and personnel must be familiar with both

gathering data in the field, and working with the collection of the field reports in the EOC.

6. Adoption of a procedure should be followed by training, exercises, evaluation, revision (if necessary), and implementation. Annual EOC training and exercises should include an exercise in immediate damage assessment by fire resources.

7. The department should share the finished SOP with other departments so that there is a clear understanding of the procedures that the emergency services will be following post disaster. The SOP may be incorporated with the San Gabriel Police Department's post disaster procedures.

Based upon the findings of this research, the San Gabriel Fire Department has the opportunity to create an immediate damage assessment procedure that conforms with fire service standards and practices. The information presented in this research paper should serve as the foundation of a comprehensive assessment process, enhancing the efficiency and effectiveness of disaster response, relief and recovery in the City of San Gabriel.

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Appendix A: SGFD Policy, Disaster Operations: Post Disaster Activity

SAN GABRIEL
FIRE DEPARTMENT

SUBJECT: DISASTER OPERATIONS

POST DISASTER ACTIVITY

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PURPOSE:

To provide direction to field units and dispatch on what to do immediately following a city-wide disaster where there is a chance of widespread human injury and/or property damage.

POLICY:

After the City experiences a widespread disaster (ie. earthquake), all Department units shall confirm status with dispatch. Units will respond to any incoming requests for aid. Dispatch policies will be followed. The *Major Incident Request* form will be utilized by dispatch to track and prioritize requests.

If there are no requests, or when no other requests for aid remain, all units will inspect their respective districts for public injuries or property damage. This inspection will be a preliminary visual assessment and not a comprehensive analysis. Units will utilize the *Major Incident Tracking* form to keep track of the findings. Information is to be communicated back to dispatch as areas are toured. Dispatch too, will use the *Incident Tracking* form. This information will be required when/if the EOC is activated.

If widespread damage is expected, no action should be started prior to the city being surveyed except where there exists an immediate threat to public safety.

Appendix B: SGFD Policy, Major Incident Request Form

SAN GABRIEL FIRE DEPARTMENT

MAJOR INCIDENT REQUEST FORM

RIORITY (1-5)	ADDRESS/STREET	CALL BACK NUMBER	TYPE OF REQUEST	TIME OF INITIAL REQUEST	SITUATION STATUS

PRIORITY

1- IMMEDIATE LIFE HAZARD
2- LIFE HAZARD THREATENED
3- FIRE/GAS LEAK
4- MAJOR STRUCTURAL DAMAGE
5- MINOR STRUCTURAL DAMAGE

Appendix C: SGFD Policy, Major Incident Tracking Form

SAN GABRIEL FIRE DEPARTMENT

MAJOR INCIDENT TRACKING FORM

RIORITY (1-5)	ADDRESS/STREET	ALL CLEAR OK	DAMAGE (DESCRIPTION)	UNIT	TIME REPORTED

PRIORITY

1- IMMEDIATE LIFE HAZARD
2- LIFE HAZARD THREATENED
3- FIRE/GAS LEAK
4- MAJOR STRUCTURAL DAMAGE
5- MINOR STRUCTURAL DAMAGE

Appendix D: SGFD Policy, Post Disaster Activity Checklist and Map (p. 66, 67)

SAN GABRIEL FIRE DEPARTMENT

SUBJECT: DISASTER OPERATIONS

POST DISASTER ACTIVITY

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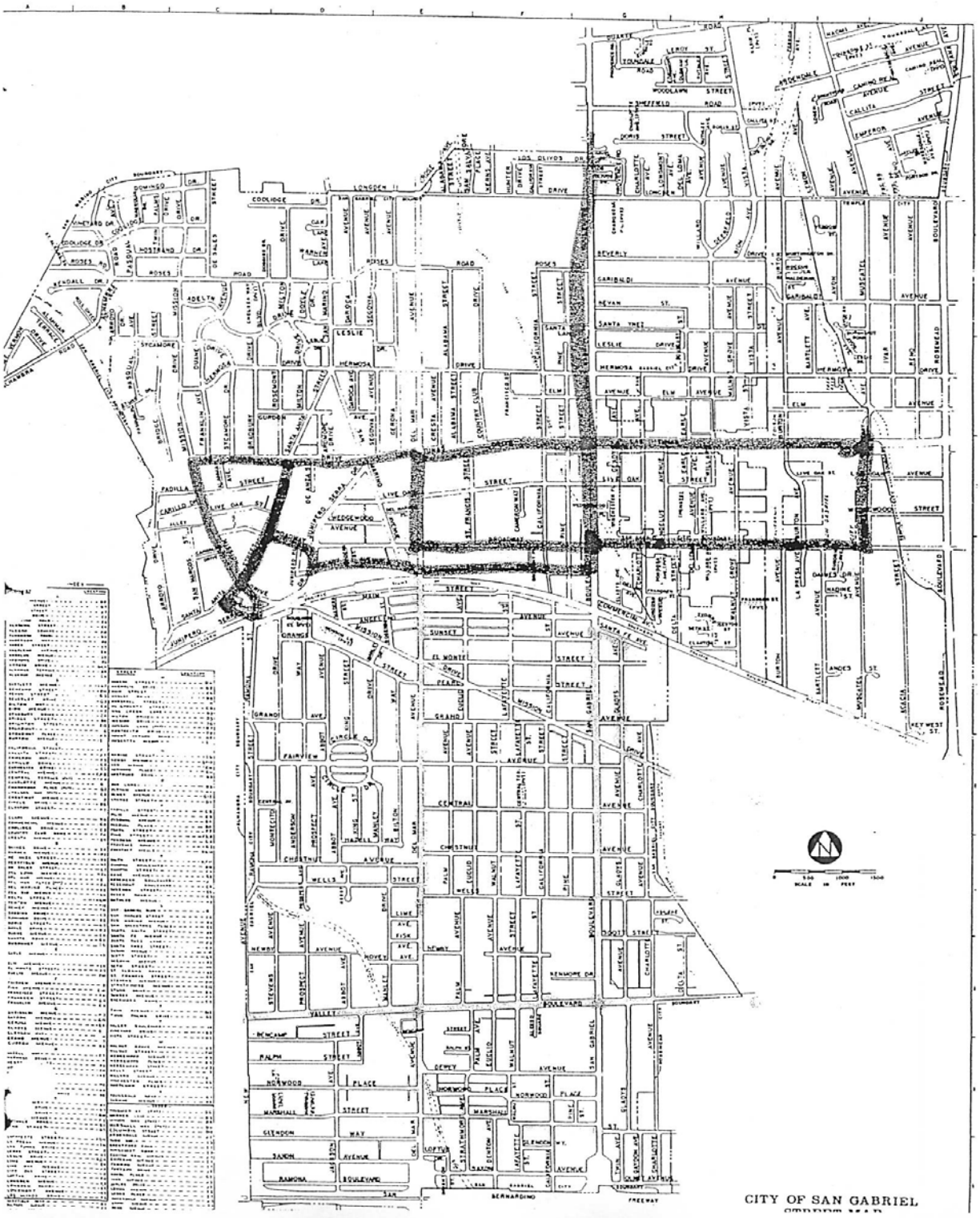
The following areas are to be checked per respective districts:

Station 52
- west on Las Tunas to Mission
- south on Mission to City Hall (inspecting Parks and Recreation building)
    - inspect City Hall and Mission area
- NE on Santa Anita to San Gabriel Valley Medical Center
    - confirming an all clear by hospital staff
- (leaving) SGVMC
- east on Clary (Agostino) to San Gabriel Blvd.
- north on San Gabriel to Broadway
- east on Broadway to Muscatel
- north on Muscatel to Las Tunas
- west on Las Tunas to Del Mar
- south on Del Mar to Broadway
- east on Broadway to San Gabriel Blvd.
- north on San Gabriel Blvd. to city limits
- rest of city to be surveyed on an as needed basis
    - schools, churches, convalescent homes, railroad tracks

Station 51
- south on Del Mar to Valley Blvd.
    - inspect 140 W. Valley Blvd.
- west on Valley Blvd. to New Ave.
- returning east on Valley Blvd. to Del Mar
- south on Del Mar to Marshall
- east on Marshall to San Gabriel Blvd.
- north on San Gabriel Blvd. to Valley Blvd.
- east on Valley Blvd. to Walnut Grove
- north on Walnut Grove to Mission
- NW on Mission to Gladys
- north on Gladys to Santa Fe
- west on Santa Fe to San Gabriel Blvd.
- south on San Gabriel Blvd. to Valley Blvd.
- west on Valley Blvd. to Del Mar
- north on Del Mar to railroad tracks
- rest of city to be surveyed on an as needed basis
    - schools, churches, convalescent homes, railroad tracks

Appendix D: SGFD Policy, Post Disaster Activity – District Map



Appendix E: EFO ARP – EAFSOEM (Year 3) Questionnaire

EFO ARP - EAFSOEM (Year 3)

SurveyMonkey

1. What is the name of your department/agency (please include the state)?

	Response Count
	86
answered question	86
skipped question	11

2. What is the size of the population your agency serves?

	Response Percent	Response Count
Less than 10,000	6.2%	6
10,001 to 50,000	32.0%	31
50,001 to 100,000	22.7%	22
100,001 to 500,000	25.8%	25
500,001 or more	13.4%	13
answered question		97
skipped question		0

3. Does your agency have a formal written policy or procedure for post disaster damage assessment?

	Response Percent	Response Count
YES - We have a written policy/procedure	32.0%	31
NO - We conduct damage assessment, but WITHOUT any formal procedure	47.4%	46
NO - We do not conduct any damage assessment	20.6%	20
Other (please specify)		3
answered question		97
skipped question		0

Appendix E: EFO ARP – EAFSOEM (Year 3) Questionnaire

4. Which of the following are part of the immediate damage assessment in your jurisdiction? (MARK ALL THAT APPLY)

	Response Percent	Response Count
FIRE DEPT RESOURCES - including firefighter casualties, damage to structure and/or vehicles, ability to respond	**87.8%**	**65**
LIFE SAFETY - Including number of injured and killed (rough estimates or exact)	79.7%	59
RESCUE PROBLEMS - Including those trapped and recommendations for resource needs	77.0%	57
PROPERTY DAMAGE - Including the number of buildings damaged in a specific area (blocks, etc)	74.3%	55
EXTENT OF DAMAGE TO PROPERTY - i.e. Destroyed, Major, Minor, etc.	67.6%	50
INFRASTRUCTURE ISSUES - Including utilities, roads, etc	77.0%	57
AGENCY/JURISDICTION PROPERTY - Including town/city hall, public buildings, schools etc.	54.1%	40
TARGET/SPECIAL HAZARDS - Including major businesses, large facilities, industrial sites	67.6%	50
HEALTH - Including hospitals, health care facilities, etc.	56.8%	42
PUBLIC HEALTH - Including sewage systems, etc	44.6%	33
TRANSPORTATION - Including waterways, rail lines, and major roadways/highways, tunnels, bridges, that may affect ingress/egress from the area.	59.5%	44

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EVACUATION SITES - Including pre-determined evacuation areas	45.9%	34
NONE OF THESE	5.4%	4
	Additional Fields	0
	answered question	**74**
	skipped question	**23**

Appendix E: EFO ARP – EAFSOEM (Year 3) Questionnaire

5. Does your department have a standardized form or checklist that is completed when conducting damage assessment and/or for those who are compiling the damage assessment information?

	Response Percent	Response Count
YES	35.1%	26
NO	**64.9%**	**48**
	Additional Comments	4
	answered question	**74**
	skipped question	**23**

6. Do you know if your agency uses a State or Federal standardized form for collecting Immediate Damage Assessment information?

	Response Percent	Response Count
YES - It is a State Form	12.0%	3
YES - It is a Federal Form	20.0%	5
YES - BOTH Federal and State forms are used	8.0%	2
YES - I don't know which though	0.0%	0
NO - We write information on our own agency created form	**48.0%**	**12**
NO - We collect information on any type of paper	0.0%	0
NO - We don't write anything down	0.0%	0
I DON'T HAVE ANY IDEA WHAT WE DO	4.0%	1
Other (please specify)	8.0%	2
	answered question	**25**
	skipped question	**72**

Appendix E: EFO ARP – EAFSOEM (Year 3) Questionnaire

7. Does your agency use an automated/electronic method of collecting and sharing damage assessment information?

	Response Percent	Response Count
YES - (See Comment Below)	9.6%	7
NO	**90.4%**	**66**
We use the following software:		7
answered question		**73**
skipped question		**24**

8. Does your agency conduct training and/or exercises related to immediate damage assessment?

	Response Percent	Response Count
YES - Training only	17.8%	13
YES - Exercises only	15.1%	11
YES - Both training and exercises	19.2%	14
NO - Neither	**47.9%**	**35**
Additional Comments		4
answered question		**73**
skipped question		**24**

Appendix E: EFO ARP – EAFSOEM (Year 3) Questionnaire

9. Do you know if your agency has developed the damage assessment procedure in conjunction with any of the following (Please mark ALL that apply)?

	Response Percent	Response Count
Community Profile (Generally part of the FEMA required agency Emergency Plan)	33.8%	24
Risk Assessment	**43.7%**	**31**
Hazard Identification	40.8%	29
Communication Plan	14.1%	10
Resource Evaluation (Who and how many will be available)	15.5%	11
Data Collection (Forms, process, route of communication)	12.7%	9
I DO NOT KNOW	26.8%	19
NO, there was no consideration given to any of these factors when the procedure was developed.	11.3%	8
OTHER (Please specify)	5.6%	4
	answered question	**71**
	skipped question	**26**

Appendix E: EFO ARP – EAFSOEM (Year 3) Questionnaire

10. Does your immediate damage assessment policy/procedure include a specified route that units take during the reconnaissance operation?

	Response Percent	Response Count
YES - Units are directed to attempt to follow a pre-determined route	9.9%	7
YES - Units are directed to assess specific areas and predetermined locations, but may not follow a specific route.	25.4%	18
NO - Units are expected to develop their own route based upon the situation.	**35.2%**	**25**
NO - There is no procedure for what any particular unit does during the immediate damage assessment process	22.5%	16
OTHER (Please specify)	7.0%	5
answered question		**71**
skipped question		**26**

11. Is there anything you wish to add that you think might be helpful with this research project?

	Response Percent	Response Count
YES (SEE BELOW)	14.3%	10
NOPE	**85.7%**	**60**
COMMENTS		11
answered question		**70**
skipped question		**27**

Appendix E: EFO ARP – EAFSOEM (Year 3) Questionnaire

12. If you have a digital/electronic copy of your policy/procedure, would you be willing to send it via email to me? My email is jroy@sgfd.org

	Response Percent	Response Count
SURE, it is on the way	21.3%	10
NO - We don't have an electronic version and I cannot scan and send a .pdf	**72.3%**	**34**
NO - I don't have time to send it to you pal...	6.4%	3
answered question		**47**
skipped question		**50**

Appendix F: EFO Damage Assessment Internal Questionnaire

1. What is your current rank?

	Response Percent	Response Count
Chief Officer	18.2%	2
Captain	**36.4%**	**4**
Engineer	27.3%	3
Firefighter, FF/PM	18.2%	2
answered question		**11**
skipped question		**0**

2. Please describe in writing, to the best of your knowledge RIGHT NOW, what the SGFD procedure is following a disaster (in general). Essentially, if a major earthquake struck right now, what are you supposed to do? (You do not need to include any Verdugo radio protocol).

	Response Count
	11
answered question	**11**
skipped question	**0**

Appendix F: EFO Damage Assessment Internal Questionnaire

3. What is your response to the last question based on?

	Response Percent	Response Count
POLICY - I have it memorized word for word, like the rest of them	9.1%	1
LOOKED IT UP	0.0%	0
GUESSING - Sounded good didn't it?	0.0%	0
COMMON SENSE - Wouldn't we all do that?	18.2%	2
SAW IT DONE THAT WAY IN _____ CITY - Thought it was a good idea	0.0%	0
FOLLOWING DIRECTION - Somebody told me to do it that way	27.3%	3
I HAVE NO IDEA	0.0%	0
Other (please specify)	**45.5%**	**5**
	answered question	**11**
	skipped question	**0**

4. What training in post disaster procedures/protocols, if any, from the SGFD?

	Response Count
	11
answered question	**11**
skipped question	**0**

Appendix F: EFO Damage Assessment Internal Questionnaire

5. Do you believe that the annual disaster drill, held in the EOC, provides fire department personnel with any training relevant to damage assessment (or conducting a windshield survey), or is there more of a focus on EOC operations and the incident command system?

	Response Percent	Response Count
YES - I get plenty of experience in windshield assessments during the annual disaster drill.	9.1%	1
NO - I learn some things at the drill, but fire department field operations are not part of it.	**36.4%**	**4**
NO - The focus of that drill is not on first responders	27.3%	3
I HAVE NOT ATTENDED A DRILL	27.3%	3
answered question		**11**
skipped question		**0**

6. Do you feel that if a major earthquake struck the City today, that the SGFD as a department is adequately prepared to respond EFFICIENTLY and EFFECTIVELY with the current policies and procedures (if there are any) in place?

	Response Percent	Response Count
YES - We are prepared to be effective and efficient in response to a city-wide disaster TODAY.	0.0%	0
NO - We may struggle through it, but it would likely not be as effectively or efficiently as it could/should be.	**100.0%**	**11**
Why or why not?		10
answered question		**11**
skipped question		**0**

Appendix F: EFO Damage Assessment Internal Questionnaire

7. Are you aware of how immediate damage assessment (windshield survey) fits into the overall response phase of a disaster event? (Do you understand the significance of the information collected or why it is done?)

	Response Percent	Response Count
YES - I know exactly how it fits into the overall operation, including where the information I collect goes and how it is used.	45.5%	5
NO - I know that we are asked to do it, but I can't say I have a thorough knowledge, or I could only simply assume, how the information gathered is used.	**54.5%**	**6**
	answered question	**11**
	skipped question	**0**

8. Do you believe that immediate damage assessment (post-disaster) is deserving of a policy/SOP?

	Response Percent	Response Count
YES	**100.0%**	**11**
NO	0.0%	0
	WHY OR WHY NOT?	11
	answered question	**11**
	skipped question	**0**

Appendix F: EFO Damage Assessment Internal Questionnaire

9. Which of the following components do you think should be included in an immediate damage assessment (windshield survey) procedure?

	Response Percent	Response Count
FIRE DEPT RESOURCES - including firefighter casualties, damage to structure and/or FD vehicles, ability to respond	**100.0%**	**11**
LIFE SAFETY - including the number of injured and killed (within the company district) estimates	63.6%	7
RESCUE PROBLEMS - including those trapped and recommendations for resource needs	63.6%	7
PROPERTY DAMAGE - including the number of buildings damaged in a specific area (blocks, etc)	63.6%	7
EXTENT of PROPERTY DAMAGE - i.e. Destroyed, Major Minor (tools available to make estimating easy from a drive by)	54.5%	6
INFRASTRUCTURE ISSUES - Including utilities, roads, etc.	**100.0%**	**11**
CITY/PUBLIC OWNED BUILDINGS - City hall, etc and schools	63.6%	7
TARGET/SPECIAL HAZARDS - Including major businesses, large facilities, high occupancy locations	72.7%	8
HEALTH - Including exterior assessment of hospitals, health care facilities	90.9%	10
PUBLIC HEALTH - Including sewage systems, etc	45.5%	5
TRANSPORTATION - Rail and major roadways including freeways, bridges etc that may affect the ingress/egress to the City	72.7%	8
EVACUATION SITES - Including pre-determined evacuation areas	63.6%	7
NONE OF THESE	0.0%	0
Other (please specify)	36.4%	4
	answered question	**11**
	skipped question	**0**

Appendix F: EFO Damage Assessment Internal Questionnaire

10. Do you think that it would be beneficial to have a standard form that includes some or all of the above areas for consistency and simplifying the assessment process?

	Response Percent	Response Count
YES	100.0%	11
NO	0.0%	0
Other (please specify)		2
answered question		11
skipped question		0

11. Do you feel that if TODAY every officer was asked to drive his district and assess the target hazards and infrastructure (without any other direction) that there would be a consistent report as to the locations assessed and the information collected during that process?

	Response Percent	Response Count
YES	18.2%	2
NO	81.8%	9
WHY OR WHY NOT?		10
answered question		11
skipped question		0

12. Do you think that the SGFD has a defined process for determining which locations are target hazards?

	Response Percent	Response Count
YES	9.1%	1
NO	90.9%	10
COMMENTS		3
answered question		11
skipped question		0

Appendix F: EFO Damage Assessment Internal Questionnaire

13. What other aides could be provided to make the post disaster immediate damage assessment process as STRAIGHTFORWARD, CONSISTENT, AND SIMPLISTIC as possible? Consider the questions already asked, and remember that the goal is consistent and attainable. (ex. SOP reminder cards on engines, checklists, forms, etc).

	Response Count
	11
answered question	11
skipped question	0

Appendix G: Draft SOP – Immediate Damage Assessment

SAN GABRIEL FIRE DEPARTMENT

OPERATIONS MANUAL

Immediate Damage Assessment Standard Operating Procedure

DATE: August 1, 2011

SECTION: DRAFT – Operations: Disaster Operations Page 1 of 2

Purpose The purpose of this standard operating procedure is to provide guidelines by which field operations commence in the event of a disaster within the City of San Gabriel.

Procedure

During the event:

- Take all steps to maintain the safety of personnel FIRST.
- Shelter in a safe place until the event has stabilized, and the immediate danger has passed.
- Contact all personnel to check for injuries; conduct a Personnel Accountability Report (PAR).
- Contact the Battalion Chief as soon as these steps are complete.
- Follow VFCC policy and protocol for communication and dispatch operation information.

Following the event:

- Provide any and all assistance to personnel trapped or injured.
- Report injuries and/or fatalities to the Battalion Chief, or VFCC if unable to contact the BC.
- Move apparatus outside to a safe area, clear of overhead obstructions, if possible.
- Survey the facility and vehicles for damage and report findings to the BC.

When personnel and facility are secured:

- After contacting the Battalion Chief, companies will likely begin the immediate damage assessment of their respective districts.
- Field units shall assess the target hazards and priority locations as indicated on their district map (to be attached once determined).
- The *SGFD IDA Information Tracking Matrix Form* shall be completed, and the information communicated to the battalion chief or his designee once completed, or as requested.

Appendix G: Draft SOP – Immediate Damage Assessment

SAN GABRIEL FIRE DEPARTMENT

OPERATIONS MANUAL

Immediate Damage Assessment Standard Operating Procedure

DATE: August 1, 2011

SECTION: DRAFT – Operations: Disaster Operations Page 2 of 2

Page 2/

- It is CRITICAL that all information is gathered in its entirety so that a clear snapshot of the situation is provided to the commanders making decisions on the response and an action plan can be developed.

- It is IMPERATIVE that units DO NOT STOP to render assistance unless their immediate actions will save lives. Delaying the flow of critical information to the incident commander will slow response from outside agencies, and may increase the number of casualties.

- Maintain communications with the incident commander, as dynamic situations may dictate a change in your current assignment.